# A RF20

# Digital Status transfer

## User Guide

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**ADEUNIS RF**
283, rue Louis Néel
38920 Crolles
France

Phone +33 (0)4 76 92 07 77
Fax +33 (0)4 76 08 97 46

Ref. 05-11-V4-tcx

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# About this document

This guide describes the A^RF20 devices, their options and accessories.

# Declaration of conformity

Manufacturer's name: **ADEUNIS R.F.**
Manufacturer's address: Parc Technologique PRE ROUX IV
283 rue Louis NEEL
38920 CROLLES - FRANCE

declares that the product if used and installed according to the user guide available on our web site www.adeunis-rf.com

Product Name: **ARF20**
Product Number(s): **ARF6188B / ARF6189B /ARF6678B**

Product options:

Complies with the RTTE Directive 99/5/EC:

EMC: conformity is proven by compliance to the harmonized standard EN 301-489
Safety: conformity to the standard EN 60950-1/2001
Radio: conformity is proven by compliance to harmonized standard EN 300-220 covering essential radio requirements of the RTTE directive.

Exposure to radio frequency signals according to the council recommendation 1999/519/EC on the limitation of exposure of general public to electromagnetic field.

es: - Conformity has been evaluated according to the procedure described in Annex III of the RTTE directive.
- Receiver class (if applicable): 3.

Crolles, November 6th, 2007
VINCENT Hervé / Quality manager

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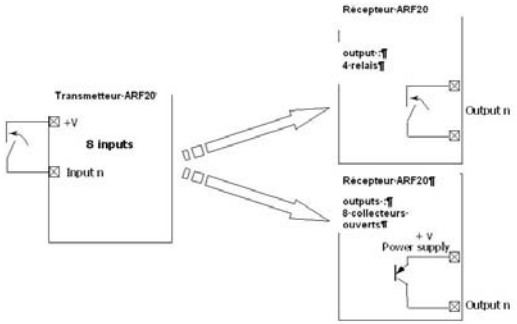
# Presentation

The A^RF20 system enables logic states to be transmitted from one point to another. It is a one-way system: the transmitter transmits these states by radio channel and the receiver decodes the messages received and restores them on binary outputs. There are 3 product references in the range, the ARF6188 transmitter and 2 receivers - ARF6189 (open collector output) and ARF6678 (relay output).
The product behaves like 8 parallel links: output 1 corresponds to input 1, output 2 to input 2 etc.

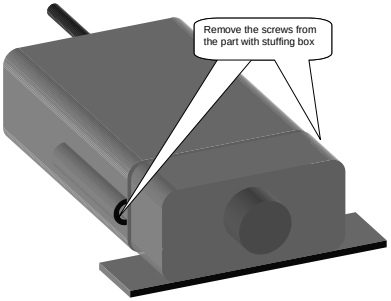



The radio link is established successively on 3 frequencies. Only one of these 3 frequencies is necessary to establish the outputs.
The transmitter scans its inputs continuously and triggers a radio transmission every 100 ms.

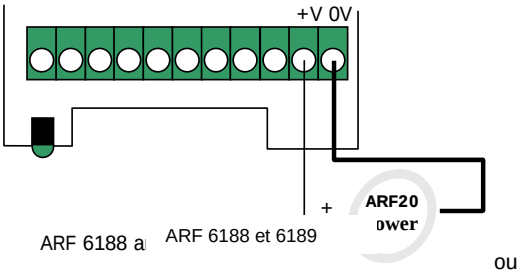
The link between transmitters and receivers is only effective after a learning phase.
The products are available either in board version to be integrated in an assembly or as an IP65 enclosure. In the latter case the products are fixed by the fixing lugs onto the top (antenna) and bottom (stuffing box) parts of the enclosure housing (4 screws not supplied).

# Product power supply

To perform wiring of these products, the bottom part of the housing (part with stuffing box) has to be opened by unscrewing the two stainless steel screws on each side.



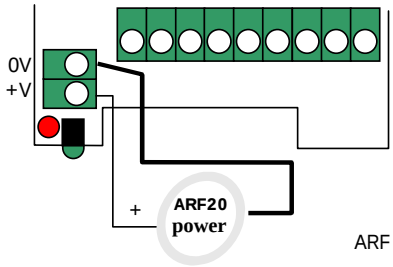

On the 4-relay receiver, turn off any mains power that may be present on the relays before opening the housing.
The A^RF20 range products are supplied with a DC voltage source.
This voltage supply must not exceed 30 Vdc.




ou



TOP

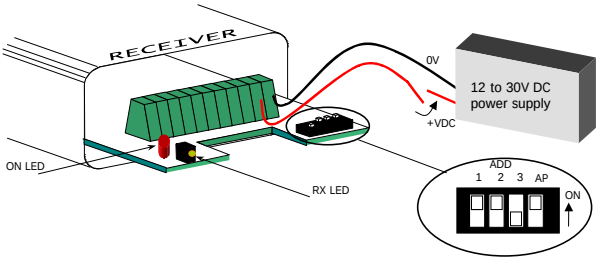



ARF 6678

# Associating a transmitter to a receiver

## Open collector receiver

The red ON led flashes twice and the green RX led is not lit, the product is correctly supplied but there is no transmitter associated to the receiver and the product cannot operate.
On the receiver, set the switch marked AP to ON to switch to learning mode. The red led flashes.

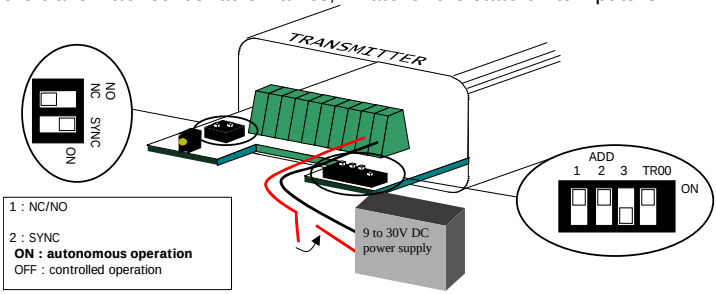



Set the switches ADD 1, 2 and 3 to the same positions on the transmitter and receiver.

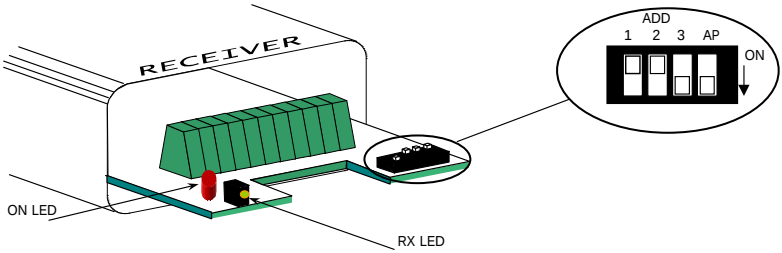


TOP

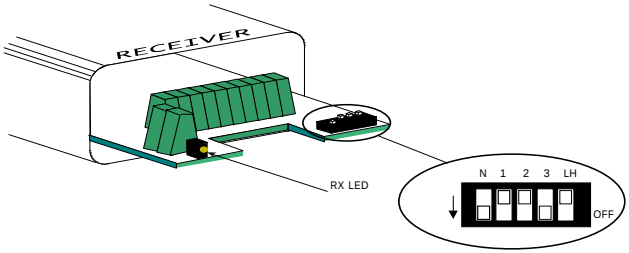
On the transmitter to be associated to the receiver, set the TR00 switch to OFF and the SYNC switch to ON, then set the power on. In this configuration the transmitter sends radio frames, whatever the state of its inputs is.




After a few seconds, the green led on the receiver lights up continuously and the transmitter has been memorised. Stop transmission and, on the receiver, switch the learning switch AP to OFF. The red ON led should be lit continuously and the product is ready to operate. The green RX led then lights up at each receipt.



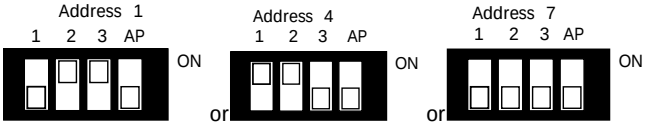

## Relay reciver



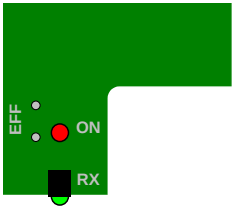

The learning procedure is identical, but the switch settings differ slightly (perform the operations in the order set out below):
Set switch #1 (N/P) to ON (normal mode) and set the next 3 switches (C1, C2, C3) to the same positions as on the transmitter.
Move switch #1 to OFF (programming mode), then set switches #2 to 5 to OFF. Then move switch 2 (AP) to ON to set the product to learning mode.

On the transmitter to be associated to the receiver, set the TR00 and SYNC switches to ON then power it on. In this configuration the transmitter sends radio frames whatever the state of its inputs.
When learning has been completed (green led continuously lit), move switch #2 to OFF.
Reset switch #1 (N/P) to ON (normal mode) and set the next 3 switches (C1, C2, C3) to the same positions as on the transmitter.

**NOTES:**
An infinite number of receivers can be associated to a transmitter. Inversely several transmitters can be associated to a receiver provided that transmissions are extremely rare (TR00 must be set to ON).
There can be several pairs of A^RF20 's in parallel on the same site. For this, they must not operate on the same channel. In this case choose addresses separated by 3, e.g. 1 (OFF, ON, ON) and 4 (ON, ON, OFF).




## Memory clear on ARF6189 receiver




To clear all the recorded serial numbers from the receiver memory, the two pads to the left of the red led have to be short-circuited. The red led then flashes. Maintain the short-circuit until the green led lights up: the memory has then been cleared.

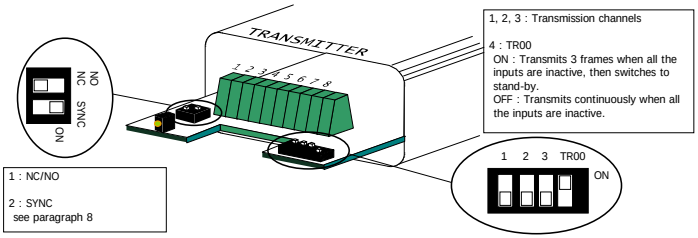
## Memory clear on ARF6678 receiver

Set switch #1 to OFF (programming mode), then set switches #2 to 5 to OFF. Then move switch #3 to ON (EF) to run the clear procedure.
After 6 seconds, the memory clear has been completed, the green led is lit continuously. Move switch #3 to the OFF position.
Reset switch #1 (N/P) to ON (normal mode) – the red led flashes indicating that the product can no longer operate.

# Input wiring

The inputs are wired on the transmitter. All the inputs are defined either normally open (NO) or normally closed (NC).
In NO mode (NO/NC on ON), an input is active if the voltage present on the terminal block is greater than +Vsupply /2. If the input is not connected or is at a voltage lower than Vsupply /2 the input is inactive. In this case, closing of a contact between the power supply and an input will make the associated relay on the receiver close.
In NC mode (NO/NC on OFF), an input is active if the voltage present on the terminal block is lower than +Vsupply/2 or not connected. If the input is at a voltage greater than Vsupply /2 the input is inactive. In this case, closing of a contact between the power supply and an input will make the associated relay on the receiver open.

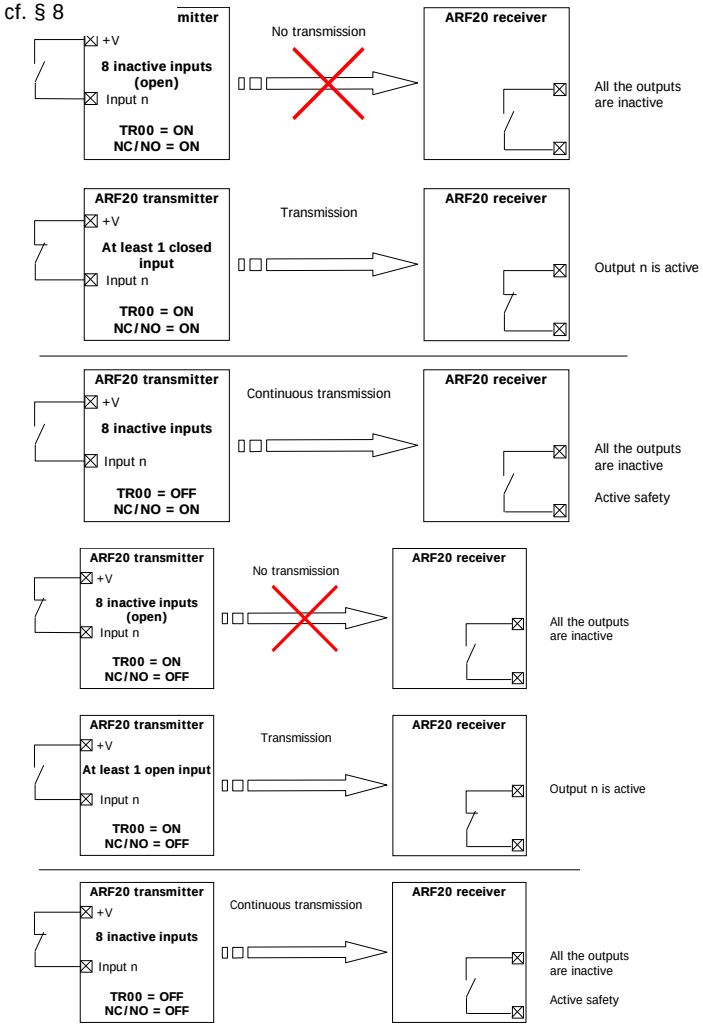
The Vsupply/2 threshold is not precise. For greater safety a low level should be considered if the voltage is less than Vsupply /3 and a high level if the voltage is more than 2 Vsupply/3.
The presence of at least one active input triggers transmission.
When all the inputs are inactive, radio transmission can be interrupted or maintained:
When TR00 is on ON, there is no transmission when all the inputs are inactive.
When TR00 is on OFF, transmission is continuous whatever the state of the inputs.
These two operating options are to be chosen with the product powered off: they will be taken into account at the next power-up.


TRANSMITTER
1 2 3 4 5 6 7 8
NC
ON
SYNC
NO
1, 2, 3 : Transmission channels
4 : TR00
ON : Transmits 3 frames when all the inputs are inactive, then switches to stand-by.
OFF : Transmits continuously when all the inputs are inactive.
1 2 3 TR00
ON
1 : NC/NO
2 : SYNC
see paragraph 8

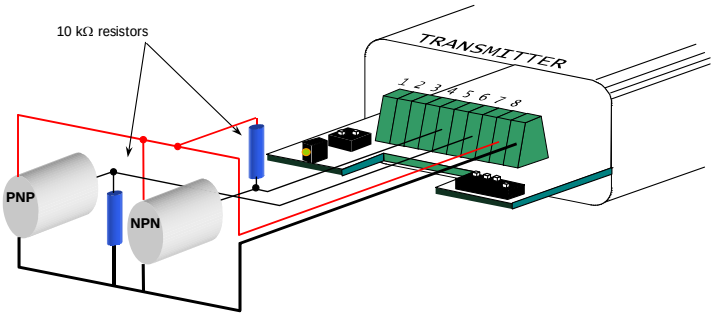


TOP

cf. § 8

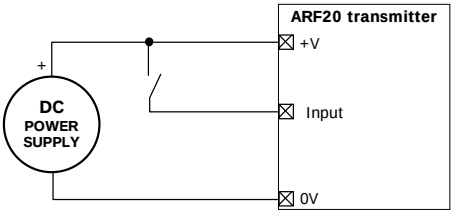

mitter
+V
8 inactive inputs (open)
Input n
TR00 = ON
NC/NO = ON
No transmission
ARF20 receiver
All the outputs are inactive
ARF20 transmitter
+V
At least 1 closed input
Input n
TR00 = ON
NC/NO = ON
Transmission
ARF20 receiver
Output n is active
ARF20 transmitter
+V
8 inactive inputs
Input n
TR00 = OFF
NC/NO = ON
Continuous transmission
ARF20 receiver
All the outputs are inactive
Active safety
ARF20 transmitter
+V
8 inactive inputs (open)
Input n
TR00 = ON
NC/NO = OFF
No transmission
ARF20 receiver
All the outputs are inactive
ARF20 transmitter
+V
At least 1 open input
Input n
TR00 = ON
NC/NO = OFF
Transmission
ARF20 receiver
Output n is active
ARF20 transmitter
+V
8 inactive inputs
Input n
TR00 = OFF
NC/NO = OFF
Continuous transmission
ARF20 receiver
All the outputs are inactive
Active safety

## 3-wire sensor connection




The sensors have the same power supply as the A^RF20 transmitter.
For a PNP sensor, the product must be set to NO mode to transmit on presence detection.
For a NPN sensor, the product must be set to NC mode to transmit on presence detection.

## Dry contact connection.

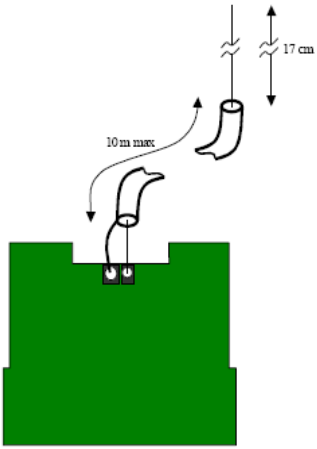





TOP

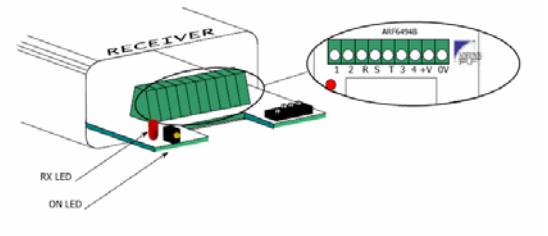
In NO mode closing of the contact triggers transmission which activates the corresponding output. In NC mode it is opening of the contact which activates this output.

## Antenna wiring




In daughter board version, an antenna has t
communication between the products.
This antenna should be a wire with a length
This length is that which has to extend outsic
metallic.
This antenna can be located remotely by using
stripped over the last 17 centimetres.

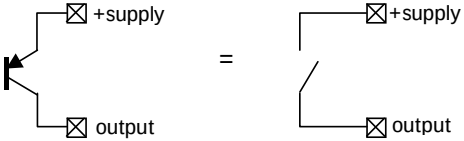
## Output wiring






TOP

The outputs are wired on the receiver. They are of the P open collector type, i.e. when an output is active the voltage on the terminal block is that of the power supply. In other words an output acts like a switch one terminal of which is connected to the +Vdc and the other terminal being the output connector:

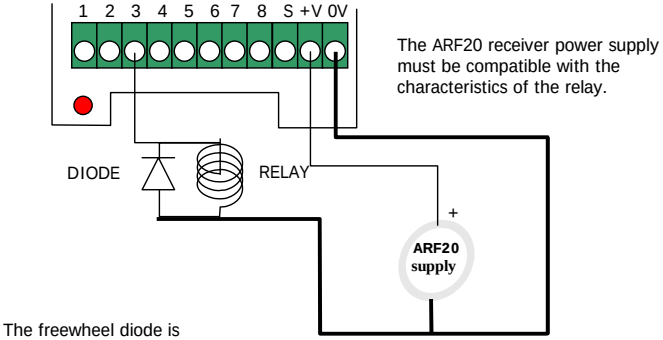



The receiver also has an output indicating data validity (S).

## Binary outputs

Output 1 copies the state of input 1, output 2 that of input 2, etc. On outputs 1 to 7 the maximum current absorbed is 100 mA. On output 8 this current increases to 1 A.
On the 4-relay receiver, the relays are the image of channels 1 to 4 when switch #5 (LH) is set to OFF, and the image of channels 5 to 8 when it is set to ON.

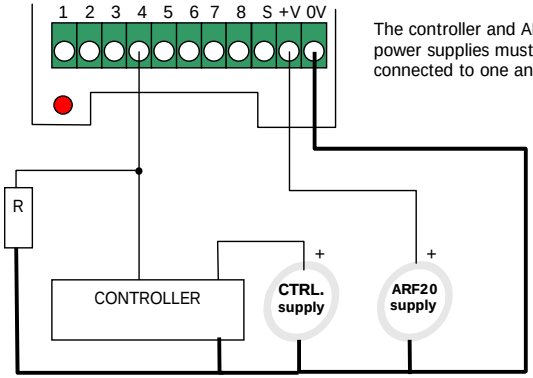
Relay wiring:


1 2 3 4 5 6 7 8 S +V 0V
The ARF20 receiver power supply must be compatible with the characteristics of the relay.
DIODE
RELAY
+
ARF20 supply
The freewheel diode is necessary to preserve the product lifetime.



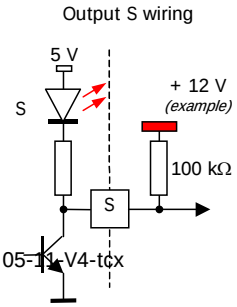
TOP

Wiring to a controller:
The ARF 20 receiver can be connected to an industrial programmable controller. An active channel sends a low level to the controller. On a negative input logic controller, reading of the channel will be direct, and on a positive input logic controller, reading of the channel will be inverted.

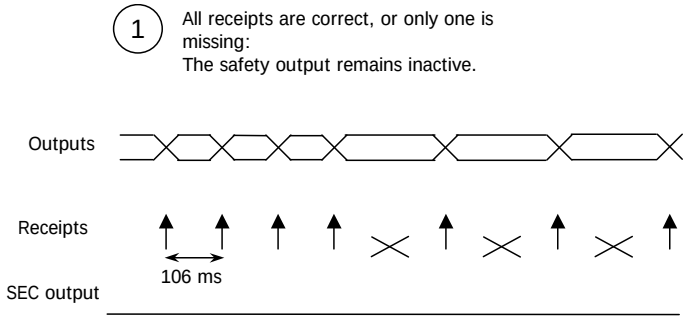

1 2 3 4 5 6 7 8 S +V 0V
The controller and ARF20 receiver power supplies must have their 0V connected to one another.
R
CONTROLLER
+
CTRL. supply
+
ARF20 supply

## Validity output on ARF6189

This is an Open Collector output marked S on the terminal block.




It is at 0V when the receiver is receiving correctly and at high level when receipt is bad. The red led furthest to the right, behind the terminal block, indicates the state of this output: On - receipt is correct, Off - no receipt.
It is not a linear output. This enables a zero output state due to absence of receipt to be differentiated from that due to no input activated.



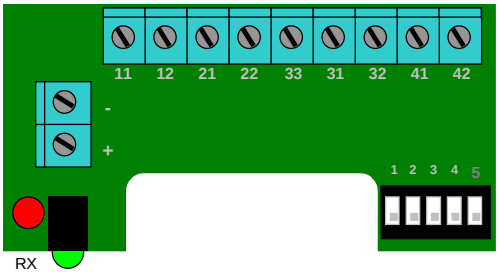

## Relay output connection.

The ARF6678 receiver is provided with 3 relays with a single NO contact and one relay with NO and NC contacts. These relays are designed to cut 12A in 250V.
These relays copy the state of the inputs of an ARF6188 transmitter after learning of this transmitter has been performed. Depending on the position

of switch #5 the relays reproduce the state of inputs 1 to 4 (switch #5 on OFF) or the state of inputs 5 to 8 (switch #5 on ON).

**NB**

If relay 1 or 3 is used for the safety output, it no longer copies the associated input but its closing indicates the quality of the radio link.

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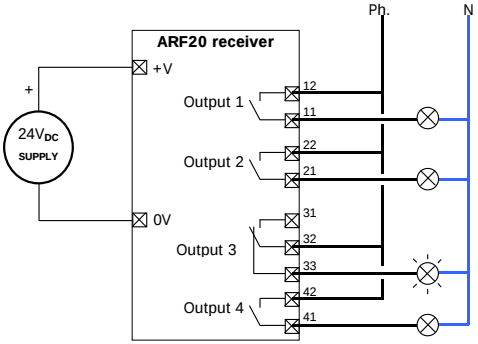
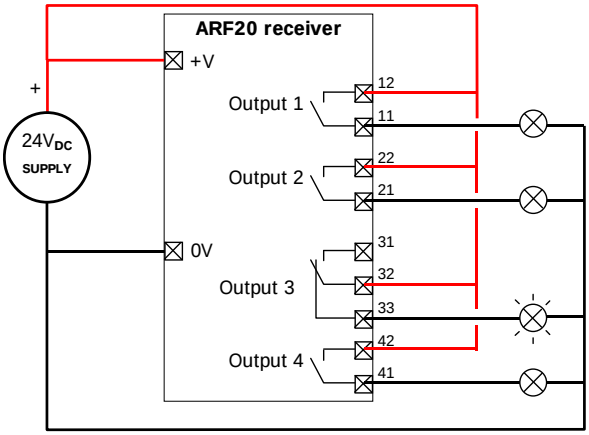
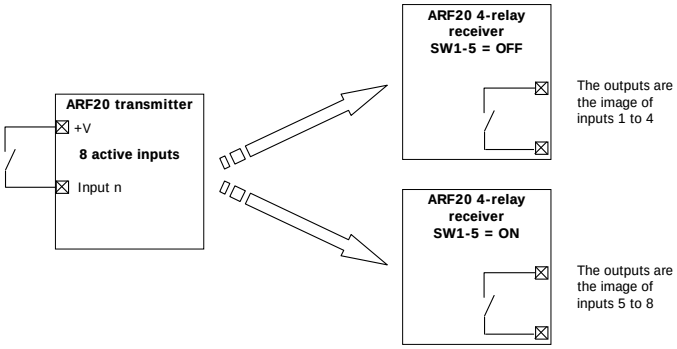
NB: If relay 1 or 3 is used for the safety output, it no longer copies the associated input but its closing indicates the quality of the radio link.


Ph.
N
ARF20 receiver
+V
0V
+
24VDC
SUPPLY
Output 1
Output 2
Output 3
Output 4
12
11
22
21
31
32
33
42
41


ARF20 receiver
+V
0V
+
24VDC
SUPPLY
Output 1
Output 2
Output 3
Output 4
12
11
22
21
31
32
33
42
41



TOP


ARF20 transmitter
+V
8 active inputs
Input n
ARF20 4-relay receiver SW1-5 = OFF
The outputs are the image of inputs 1 to 4
ARF20 4-relay receiver SW1-5 = ON
The outputs are the image of inputs 5 to 8

## Validity output on ARF6678

On this receiver the information is available as an option on a relay. This can be on relay 1 (NO) or relay 3 (NO/NC), as required.

Safety validation on relay 1

Set switch #1 to OFF (programming mode), then set switches #2 to 5 to OFF, and then move switches #4 (SE) and 5 (14) to ON.
Reset switch #1 (N/P) to ON (normal mode) and set the next 3 switches (C1, C2, C3) to the same positions as those of the transmitter (ADD 1, 2 and 3).

Safety validation on relay 3

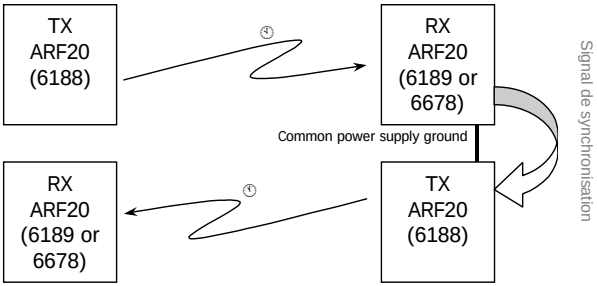
Set switch #1 to OFF (programming mode), then set switches #2 to 5 to OFF. Then move switch #4 (SE) to ON and switch #5 (14) to OFF.
Reset switch #1 (N/P) to ON (normal mode) and set the next 3 switches (C1, C2, C3) to the same positions as those of the transmitter (ADD 1, 2 and 3).

Safety disable

Set switch #1 to OFF (programming mode), then set switches #2 to 5 to OFF. Then move switch #4 (SE) to OFF.
Reset switch #1 (N/P) to ON (normal mode) and set the next 3 switches (C1, C2, C3) to the same positions as those of the transmitter (ADD 1, 2 and 3).

# Synchronised mode

This mode enables two-way links to be achieved with 2 A^RF20 pairs. In this case the return link is dependent on the outgoing link.

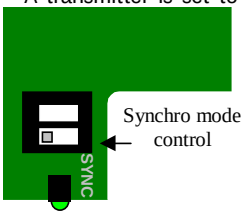


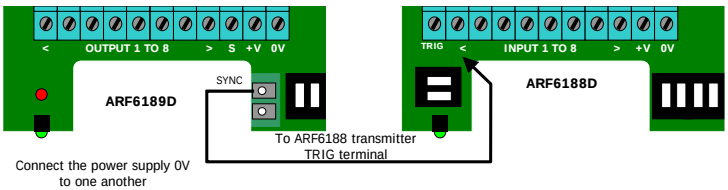

The link (2) only works if link (1) is present. Take care over transmission in rest state.

Setting transmitter to synchro mode

A transmitter is set to synchro mode by setting switch #2 marked SYNC to OFF.

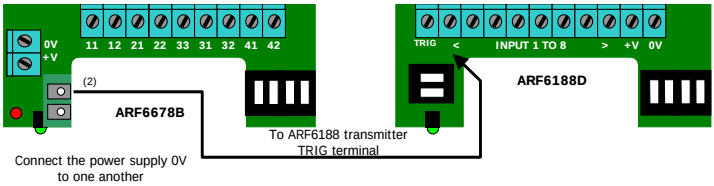
Then connect the synchro output of the link (1) receiver (pad to be soldered marked "sync" / ARF6189 or "2" / ARF6678) to the TRIG input terminal of the link (2) receiver.



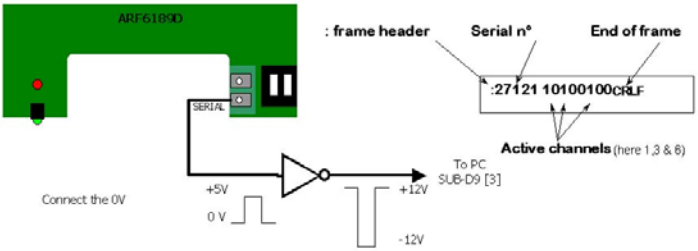


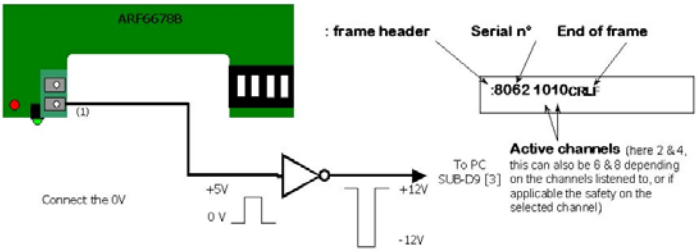

TOP




# Serial output

The two ARF20 range receivers are equipped with a TTL format serial link output.
The format is fixed: 9600 bauds / 8 bits, no parity 1 stop.



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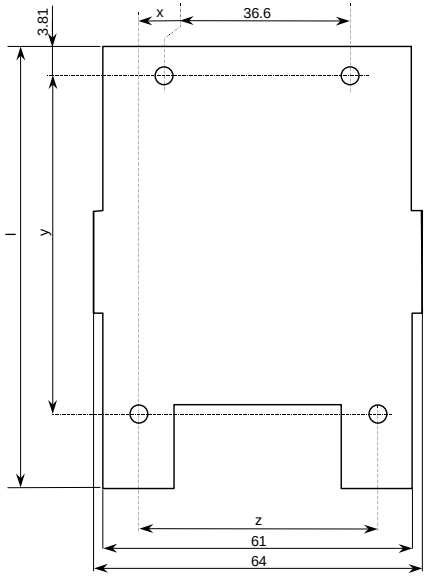
# Board dimension




| Copper | l | x | y | z |
|---|---|---|---|---|
| ARF6188 | 87 | 7.75 | 67.06 | 52.84 |
| ARF6189 | 87 | 7.49 | 67.82 | 52.84 |
| ARF6678 | 122 | -6.6 | 105.3 | 23 |

# Specifications

Operating temperature: -20°C to +70°C
Communication channels :

| ADDRESS | SW3 | SW2 | SW1 | Low channel | Middle channel | High channel |
|---|---|---|---|---|---|---|
| 1 | ON | ON | OFF | 2 (433.150) | 23 (433.675) | 46 (434.250) |
| 2 | ON | OFF | ON | 5 (433.225) | 26 (433.750) | 49 (434.325) |
| 3 | ON | OFF | OFF | 8 (433.300) | 29 (433.825) | 52 (434.400) |
| 4 | OFF | ON | ON | 11 (433.375) | 32 (433.900) | 55 (434.475) |
| 5 | OFF | ON | OFF | 14 (433.450) | 35 (433.975) | 58 (434.550) |
| 6 | OFF | OFF | ON | 17 (433.525) | 40 (434.100) | 61 (434.625) |
| 7 | OFF | OFF | OFF | 20 (433.600) | 43 (434.175) | 64 (434.700) |
| 0 | ON | ON | ON | | | |

## Transmitter

Power supply: 9 to 30 VDC
Multi-channel between 433.125 MHz and 434.7 MHz.
Power: 10 mW / 50 Ω.
8 dry contact inputs. Zin > 50 kΩ.
Consumption: 30 mA.

## Receiver

Multi-channel between 433.125 MHz and 434.7 MHz.
Sensitivity: better than 1.2 µV.
ARF6189 : 8 open collector outputs:VCE max. 30 V.
Power supply: 9 to 30 VDC
Maximum absorbable current outputs 1 to 7: 100 mA



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| | |
|---|---|
| Maximum absorbable current output 8: | 1 A. |
| Receipt validity output. | |
| ARF6678: 4 relay outputs: | 10A / 250V. |
| Power supply: | 15 to 30 VDC |
| NO contact on outputs 1, 2 or 4 | |
| NO/NC contacts on output 3 | |
| Receipt validity output: | disabled, or on relay 1 or relay 3, as required. |
| Consumption: | 53 mA excluding output |
| Conversion | |
| Refresh period: (up to 320 ms when establishing the link) | 106 ms. |

## Dimensions

| | |
|---|---|
| 6188B and 6189B IP65 chip: | 104 x 300 x 35 mm |
| 6678B IP65 chip: | 104 x 335 x 35 mm |
| Distance between fixing points 6188B and 6189B : 4 holes diam. 4 to 92 x 61 mm | |
| Distance between fixing points 6678B: 4 holes diam. 4 to 92 x 96 mm | |

References

**ARF6188A: ARF20 transmitter, board version.**
**ARF6188B: ARF20 transmitter in IP65 chip version.**
**ARF6189A: 8 open collector ARF20 receiver, board version.**
**ARF6189B: 8 open collector ARF20 receiver in IP65 chip version.**
**ARF6678A: 4-relay ARF20 receiver, board version.**
**ARF6678B: 4-relay ARF20 receiver in IP65 chip version.**
**ARF03: Antenna kit for the ARF618xA and ARF6678A in board version.**

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